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CP-201900569
TXX-19091

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Ref 10 CFR 50.73

09/30/2019

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT – UNIT 2
DOCKET NO. 50-446
AUTOMATIC REACTOR TRIP DUE TO TURBINE TRIP
SUPPLEMENTAL LICENSEE EVENT REPORT (LER) 2-18-001-01

Dear Sir or Madam:

Enclosed is Supplemental Licensee Event Report (LER) 2-18-001-01, "Unit 2 Automatic Reactor Trip Due to Turbine Trip" for Comanche Peak Nuclear Power Plant (CPNPP), Unit 2.

This letter contains no new regulatory commitments.

If you have any questions regarding this submittal, please contact Garry Struble at (254) 897-6628 or garry.struble@luminant.com.

Sincerely,

Thomas P. McCool

IE22
NRR

Enclosure COMANCHE PEAK NUCLEAR POWER PLANT – UNIT 2,
AUTOMATIC REACTOR TRIP DUE TO TURBINE TRIP
SUPPLEMENTAL LICENSEE EVENT REPORT (LER) 2-18-001-01

c – Scott Morris, Region IV
Natreon Jordan, NRR
Resident Inspectors, Comanche Peak

NRC FORM 366
(04-2018)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 03/31/2020

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. Facility Name	2. Docket Number	3. Page
Comanche Peak Nuclear Power Plant	05000 446	1 OF 4

4. Title

Automatic Reactor Trip Due to Turbine Trip

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number 05000
08	13	2018	2018	- 001	- 01	09	30	2019	Facility Name	Docket Number 05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☑ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
100	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(i)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(ii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A)	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Garry W Struble	(254) 897-6628

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable to ICES	Cause	System	Component	Manufacturer	Reportable to ICES
E	TL	EC	Siemens	Yes					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) ☑ No				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On August 13, 2018, Comanche Peak Nuclear Power Plant, Unit 2 experienced an automatic reactor trip due to an automatic turbine trip. Unit 2 was at approximately 100% reactor power when the turbine tripped. Because reactor power was greater than 50% power an automatic reactor trip was initiated. The automatic turbine trip was caused by a loss of generator excitation. The loss of generator excitation also caused a generator lockout. One channel of the main generator voltage regulator failed due to a power supply failure and automatically swapped to the backup channel. The primary function of the power supply that failed was to supply power to the firing thyristor in the Thyristor Voltage Regulator (TVR). Upon loss of power, firing was not possible and excitation current fell rapidly. The primary channel swapped to manual prior to changing over to the backup channel. The backup channel was in manual when it assumed control due to the TVR being in manual (from the primary channel) at the time of fail over. Corrective actions include replacing the failed power supply and evaluating modification of the excitation system.

Analysis did not identify any changes to the original submittal of LER 2-18-001-00. The failure described was the cause of the event and main generator and main turbine protection system performed as designed in response to the failed power supply.

All times are in Central Daylight Time (CDT).

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Comanche Peak Nuclear Power Plant	05000-446	2018	- 001	- 1

NARRATIVE

I. DESCRIPTION OF REPORTABLE EVENT

At 2258 CDT on August 13, 2018, Comanche Peak Nuclear Power Plant, Unit 2 experienced an automatic reactor trip due to an automatic turbine trip. The auxiliary feedwater system automatically started as expected.

A. REPORTABLE EVENT CLASSIFICATION

The event is reportable under 10 CFR 50.73(a)(2)(iv)(A), "Any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of this section." The systems which were automatically actuated were the Reactor Protection System (RPS) and the Auxiliary Feedwater System (AFW) starting as designed due to low-low steam generator water level following the trip.

B. PLANT CONDITION PRIOR TO EVENT

At 2258 on August 13, 2018 Comanche Peak, Unit 2 was operating in MODE 1 at approximately 100% rated thermal power.

C. STATUS OF STRUCTURES, SYSTEMS, OR COMPONENTS THAT WERE INOPERABLE AT THE START OF THE EVENT AND CONTRIBUTED TO THE EVENT

There were no structures, systems, or components which were inoperable prior to the event which contributed to the event. Prior to the main turbine trip, the main turbine and generator were performing their design functions.

D. NARRATIVE SUMMARY OF THE EVENT, INCLUDING DATES AND APPROXIMATE TIMES

At 2258 CDT on August 13, 2018, Comanche Peak Nuclear Power Plant, Unit 2 received First Out Annunciator "RX > 50% PWR TRB TRIP." The turbine trip was actuated from a main Generator Total Loss of Field concurrent with a Generator High Current. Generator protective relay 40-1/2G actuation initiated a turbine trip and generator lockout.

The cause of the event was a failure of the primary channel in the main generator Thyristor Voltage Regulator (TVR). A failed primary channel power supply [EIIS:(TL)(EC)] caused a loss of main generator excitation current. The primary channel shifted to manual prior to changing over to the backup channel. The backup channel was in manual when it assumed control due to the TVR being in manual (from the primary channel) at the time of fail over. The loss of main generator excitation caused generator protective relay 40-1/2G, "Total Loss of Field" to actuate initiating a turbine trip and generator lockout. Unit 2 was operating at greater than 50% reactor power causing the automatic reactor trip. Westinghouse permissive signal P-9, "Reactor less than or equal to 50% power turbine trip permissive" blocks a reactor trip due to turbine trip below 50% power. Since reactor power was greater than 50% the block was disabled and the turbine trip initiated the reactor trip.

The failed power supply was replaced and Unit 2 returned to MODE 1 at 0303, August 16, 2018.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
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Comanche Peak Nuclear Power Plant	05000-446	2018	- 001	- 1

NARRATIVE

E. THE METHOD OF DISCOVERY OF EACH COMPONENT OR SYSTEM FAILURE, OR PROCEDURAL PERSONNEL ERROR

Initial indication of the event was provided to the Control Room Operators by plant computer alarms, "GEN 2G PHASE A, B, & C CURRENT high and "GEN MVAR" low. These alarms were directly followed by First Out Annunciator "RX > 50% PWR TRB TRIP." Operators (Utility, Licensed) confirmed automatic reactor and turbine trips.

II. COMPONENT OR SYSTEM FAILURES

A. CAUSE OF EACH COMPONENT OR SYSTEM FAILURE

The cause of the event was failure of the TVR primary channel power supply. The failed power supply caused a loss of main generator excitation current. The loss of excitation current caused a turbine trip and a generator lockout. The system design is for the other channel (backup channel) to automatically take control of the TVR and control excitation current. The loss of excitation current was so rapid the primary channel swapped from automatic to manual. When the primary channel swapped from automatic to manual the backup channel also swapped to manual by design. The backup channel then became the primary channel. With the TVR in manual, excitation current could not be recovered prior to receiving the turbine trip. The failure of the primary channel power supply is thought to be age related.

B. FAILURE MODE, MECHANISM, AND EFFECTS OF EACH FAILED COMPONENT

When the TVR primary channel power supply failed, the primary channel shifted to manual. In manual the primary channel could not adjust excitation current. When the primary channel swapped to manual the backup channel also swapped to manual by design. When the backup channel became the controlling channel it was in manual and could not recover excitation current. With the loss of excitation, protective relay 40-1/2G initiated a turbine trip and a generator lockout. With the turbine trip occurring above 50% power the reactor automatically tripped.

C. SYSTEMS OR SECONDARY FUNCTIONS THAT WERE AFFECTED BY FAILURE OF COMPONENTS WITH MULTIPLE FUNCTIONS

This event did not involve systems or secondary functions which were affected by the power supply failure.

D. FAILED COMPONENT INFORMATION

The TVR primary channel power supply failure is specifically; TVR channel 1 Sitor-Set, - 24 vdc power supply, component number 2-JD01-A100-G12, provided to Siemens by MTM Power, part number PMN10 S24.

III. ANALYSIS OF THE EVENT

A. SAFETY SYSTEM RESPONSES THAT OCCURRED

The Reactor Protection System responded as designed to the automatic turbine trip by initiating an automatic reactor trip. Automatic start of the AFW system was the expected response and the system responded as designed.

NARRATIVE

B. DURATION OF SAFETY SYSTEM TRAIN INOPERABILITY

The event reported herein did not involve the inoperability of any safety component or system.

C. SAFETY CONSEQUENCES AND IMPLICATIONS OF THE EVENT

A turbine trip is an ANS Condition II event (Faults of Moderate Frequency). When the main turbine tripped the reactor was automatically tripped and the auxiliary feedwater system automatically started to provide feedwater to the steam generators.

Automatic turbine trip and automatic reactor trip were exercised and the Auxiliary Feedwater System started automatically as expected and all plant safety systems responded as designed during the resultant transient. This event had no impact on nuclear safety, reactor safety, radiological safety, environmental safety or the safety of the public. This event has been evaluated as not meeting the definition of a safety system functional failure per 10 CFR 50.73(a)(2)(v).

IV. CAUSE OF THE EVENT

The cause of the event was a loss of excitation current to the main generator as the result of a power supply failure in the TVR. The loss of excitation current caused a turbine trip and a generator lockout. Because reactor power at the time of the turbine trip was approximately 100% power, the Westinghouse P-9 signal was unblocked (power > 50%) so when the turbine tripped an automatic reactor trip was actuated.

V. CORRECTIVE ACTIONS

The failed power supply was replaced and the Unit was restarted using Channel 2 as the primary and Channel 1 as the backup channels for the TVR.

VI. PREVIOUS SIMILAR EVENTS

There have been no similar reportable events at Comanche Peak in the past three years.